

CLAIMS:

1. A drive voltage generating apparatus having a plurality of drive voltage generating sections, wherein each  
5 drive voltage generating section corresponds to one of a plurality of load devices and outputs a drive voltage to the corresponding load device, wherein each drive voltage generating section includes:

10 a switching element that switches a direct current voltage to generate the drive voltage;

sampling means that samples an analog signal representing a load state of the corresponding load device; and

controlling means, wherein the controlling means causes the sampling means to perform sampling according to a  
15 predetermined control period, and wherein, based on a result of the sampling, the controlling means controls the switching element,

wherein the apparatus further comprises:

20 synchronizing means that synchronizes the control periods of all the drive voltage generating sections,

wherein each controlling means commands the corresponding sampling means to sample the analog signal at timing where any of the switching elements in the drive voltage generating sections does not perform switching.

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2. The drive voltage generating apparatus according to claim 1,

wherein the synchronizing means includes a clock signal generating circuit, wherein the clock signal generating  
30 circuit generates a clock signal defining the control period, and

wherein the clock signal generating circuit supplies the common clock signal to the controlling means of all the drive voltage generating sections.

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3. The drive voltage generating apparatus according to claim 1,

wherein the controlling means uses a triangular wave signal having the control period to control the switching elements, thereby causing the switching elements to perform switching at timing other than vertexes of the triangular wave signal, and

wherein the controlling means causes the sampling means to perform sampling at timing of the vertexes of the triangular wave signal.

4. The drive voltage generating apparatus according to claim 2,

wherein the controlling means uses a triangular wave signal having the control period to control the switching elements, thereby causing the switching elements to perform switching at timing other than vertexes of the triangular wave signal, and

wherein the controlling means causes the sampling means to perform sampling at timing of vertexes of the triangular wave signal.

5. A method for controlling a drive voltage generating apparatus having a plurality of drive voltage generating sections, wherein each drive voltage generating section corresponds to one of a plurality of load devices and outputs a drive voltage to the corresponding load device, wherein each drive voltage generating section performs steps of:

switching a direct current voltage to generate the corresponding drive voltage;

sampling an analog signal representing a load state of the corresponding load device according to a predetermined control period; and

switching the direct current voltage based on a result of the sampling,

wherein the method further comprises:

synchronizing the control periods of all the drive voltage generating sections, and

5 wherein the sampling is performed at timing where no switching is performed in any of the drive voltage generating sections.

6. The controlling method according claim 5,  
wherein the synchronizing includes supplying a common  
10 clock signal defining the control period to all the drive voltage generating sections.

7. The controlling method according claim 5,  
wherein, in the generating of the drive voltage, a  
15 triangular wave signal having the control period is used to control the timing of the switching, and wherein the switching is performed at timing other than vertexes of the triangular wave signal, and  
wherein the sampling is performed at timing of vertexes  
20 of the triangular wave signal.

8. The controlling method according claim 6,  
wherein, in the generating of the drive voltage, a  
triangular wave signal having the control period is used to  
25 control the timing of the switching, and wherein the switching is performed at timing other than vertexes of the triangular wave signal, and  
wherein the sampling is performed at timing of vertexes  
of the triangular wave signal.

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9. A drive voltage generating apparatus having a plurality of drive voltage generating sections, wherein each drive voltage generating section corresponds to one of a plurality of load devices and outputs a drive voltage to the  
35 corresponding load device, wherein each drive voltage

generating section includes:

a switching device that performs switching to generate the drive voltage from a direct current voltage;

5 a sensor for detecting a load state of the corresponding load device, wherein the sensor outputs an analog signal representing the detected load state;

a sampling device that samples the analog signal; and

10 a controller that controls the switching device and the sampling device according to a predetermined control period, wherein the controller causes the sampling device to perform sampling at timing according to the control period, wherein the controller controls the switching device based on results of the sampling, and causes the timing of the sampling to be different from timing at which the switching device performs  
15 switching;

wherein the apparatus further comprises:

a synchronizing device that synchronizes the control periods of all the drive voltage generating sections, wherein the synchronizing device causes the switching timing of all  
20 the switching devices to be different from the sampling timing of all the sampling devices.

10. The drive voltage generating apparatus according to claim 9,

25 wherein the synchronizing device includes a clock signal generating circuit, wherein the clock signal generating circuit generates a clock signal defining the control period, and

30 wherein the clock signal generating circuit supplies the common clock signal to the controllers of all the drive voltage generating sections.

11. The drive voltage generating apparatus according to claim 9,

35 wherein each controller uses a triangular wave signal

having the control period to control the corresponding switching device, thereby causing the switching device to perform switching at a timing other than vertexes of the triangular wave signal, and

5        wherein each controller causes the corresponding sampling device to perform sampling at a timing of vertexes of the triangular wave signal.

12. The drive voltage generating apparatus according to  
10 claim 10,

      wherein each controller uses a triangular wave signal having the control period to control the corresponding switching device, thereby causing the switching device to perform switching at a timing other than vertexes of the  
15 triangular wave signal, and

      wherein each controller causes the corresponding sampling device to perform sampling at a timing of vertexes of the triangular wave signal.